Influence of lactic acid fermentation on iron-gallic acid complexation

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Gallic acid (GA) is a phenolic acid which can be found in legumes, fruits, nuts and beverages. These products are also rich in minerals like iron and zinc. GA contains a galloyl group leading to complexation with iron, and thus decreasing the bio-availability of iron. It is known that complexation of GA-iron is pH-dependent. Therefore, lactic acid fermentation could be a technique to improve the bio-availibilty of iron. On the other hand different lactobacillus strains are able to metabolise GA into pyrogallol (PYR).
In this study, it was aimed to investigate the influence of pH and microbial conversion of GA on iron complexation during fermentation with *Lactobacillus plantarum* and *Lactobacillus collinoides*. Different concentrations GA (0, 0.5, 1.5 and 3 mM) were added to a modified MRS broth (2g/l galactose as carbon source), combined with 10 µg/ml Fe^{2+}. Incubations were done for 14 days at 30 °C.
PYR was detected as the only conversion product of GA. At the end of the incubations, a decrease in pH to pH 5 and 5.7 for *L. plantarum* and *L. collinoides* respectively were measured. During fermentation, a shift from a green/black colour towards brown-red was observed for both bacteria in the fermentation medium, which could give an indication of complex formation. From the results obtained by LC-MS and UV-spectrophotometry, it could be concluded that the effect of pH on complexation was more pronounced compared to the bacterial conversion of GA to PYR.

References

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